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DEVELOPING STUDENTS' LOGICAL THINKING SKILLS BASED ON PROBLEM-SOLVING TASKS IN PRIMARY GRADES

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ABSTRACT:

This article examines the impact of using problem-based tasks in the process of primary education on the development of students' logical thinking skills. The study analyzes the didactic features of problem-based tasks and their role in activating students' cognitive activity. The analysis based on scientific sources shows that problem-based tasks contribute to the development of analytical thinking, understanding cause-and-effect relationships, and forming conclusion-making skills among students

Introduction

The primary education stage plays an important role in the intellectual development of students. It is during this period that the initial skills of logical thinking are formed. Using methods that encourage students to be active in the learning process helps to effectively organize their cognitive process. In this regard, lessons organized based on problem-solving tasks have important pedagogical significance in developing students' thinking skills. The purpose of this article is to scientifically substantiate the possibilities of using problematic tasks in the elementary grades in the development of logical thinking.

Main part

In pedagogical research, problem-solving tasks are recognized as a means of education that directs the student to independent research. V. Ocon argues that problematic assignments encourage students to think actively by putting a certain cognitive challenge in

front of them. Such assignments serve to organize the thinking process of the student, rather than give Ready-Made knowledge.

The use of educational games and modern pedagogical technologies is important for the effective implementation of problem-solving tasks in primary education. For example, the “Brainstorming” method allows students to freely express all their ideas during the problem-solving process. The ideas expressed in this method are then analyzed and the most optimal solutions are selected. Also, the “Why?The " " scheme requires students to explain the reason after each answer. This develops students' skills in justifying their opinions, understanding cause-and-effect relationships, and drawing logical conclusions.

The use of interactive tasks, in particular mathematical rebuses, logical puzzles, and crosswords, increases students' cognitive activity and serves to organize their logical thinking process in an interesting and effective way. Psychologist scientist L.S. Vygotsky emphasizes that problematic situations that arise in the learning process are an important factor in the development of a child's thinking. Using problem-solving tasks in primary school teaches students to perform logical operations, that is, to compare, analyze, and generalize. As a result, students acquire knowledge not in a ready-made state, but in the process of research. I.Ya. Lerner's research has scientifically proven that problem-based tasks serve to increase students' cognitive activity. The systematic application of these assignments in elementary grades enhances the participation of students in the course process, develops the skills of reasoning and making logical conclusions. This increases the overall effectiveness of the educational process.

Analysis and Results

When logical thinking skills are intentionally developed through problem-solving tasks in primary grades, several important educational benefits become evident. Students are introduced to tasks that require reasoning, pattern recognition, inference, and justification, rather than simple rote memorization. This exposure fundamentally changes how they approach learning and nurtures essential mental habits early in life. At the core of this development is the shift in classroom dynamics. Teachers who prioritize problem-solving foster an active, student-centered environment. Students no longer wait passively for answers but become involved in the journey toward discovering solutions. They are given opportunities to explore various approaches, consider alternatives, and discuss their ideas with classmates. As students share different strategies and compare methods, their logical reasoning becomes more refined. Such discussions support the development of clear

communication skills and reinforce the practice of justifying one's thinking. Moreover, regular engagement with problem-solving tasks trains students to break complex problems into manageable parts. Young learners begin to link concepts, notice relationships, and build upon prior knowledge. For example, when students face a mathematical puzzle or a real-life scenario requiring a solution, they must analyze the information, identify what is relevant, and think critically about the steps needed to resolve the issue. This process enhances their organizational skills and the ability to sequence thoughts coherently [1].

Problem-solving also plays a valuable role in increasing students' resilience. Inevitably, some tasks are challenging and initial solutions do not always work. Nevertheless, students learn persistence and adaptability, recognizing that mistakes are opportunities for growth. Through trial and error, and with guidance from the teacher, students develop strategies for overcoming obstacles and gradually emerge as independent thinkers. The benefits extend beyond mathematics or logical games. These cognitive skills are transferable across the curriculum. For instance, in language subjects, students might analyze stories for cause and effect, make inferences about characters' motivations, or sequence events logically. In science, they may use evidence to support hypotheses. In every case, problem-solving skills link directly with logical thinking. Over time, the cumulative impact of such an approach is significant. Students become more self-directed, capable of setting goals, monitoring their progress, and evaluating outcomes. Their ability to reason systematically enhances not only academic achievement but also personal confidence. Furthermore, classrooms grounded in problem-solving are lively and collaborative. Students develop respect for different viewpoints and realize that problems can often have more than one solution. This openness encourages creativity, flexibility, and inclusiveness in thought processes [2].

Emphasizing the development of logical thinking skills through problem-solving tasks from an early age lays a robust foundation for future learning. Primary students learning in this way become well-equipped for higher-order challenges. They display better decision-making abilities, increased motivation for learning, and a readiness to tackle unfamiliar problems with confidence. The benefits of this approach extend well beyond the classroom, preparing students to succeed not just academically, but in all areas of life [3].

Recent studies have shown considerable positive impacts of integrating problem-solving tasks into primary education for the development of students' logical thinking skills. Research conducted in a variety of educational settings demonstrates that approximately eighty percent of primary grade students who regularly engaged in structured problem-

solving tasks showed noticeable improvements in their ability to reason logically and apply critical thinking strategies. In comparison, only about fifty percent of students who relied mostly on traditional instruction without problem-solving elements demonstrated similar growth in logical thinking abilities. Furthermore, the studies indicate that over seventy-five percent of teachers observed increased student participation and interest when problem-solving activities were implemented. This engagement is crucial for cognitive development at a young age. Another significant finding reveals that around eighty-five percent of students exposed to frequent problem-solving tasks performed better in assessments requiring analytical thinking, such as identifying patterns or drawing conclusions, than their peers who had limited exposure to such activities [4].

In addition, student surveys reported by researchers suggest that more than sixty percent of primary students felt more confident in attempting new and complex tasks after regularly working on problem-solving exercises. This self-confidence is an important factor in fostering independence and resilience. Approximately seventy percent of parents also noticed improvements in their children's ability to make reasoned decisions in everyday situations. It is also important to note that classrooms with a higher frequency of problem-solving tasks (at least three times a week) saw a twenty to thirty percent greater increase in logical thinking test scores over an academic year than classrooms where such tasks were less frequent. Moreover, about ninety percent of teachers agreed that the integration of problem-solving tasks not only supported logical thinking but also contributed positively to students' collaborative learning and communication skills. The statistical evidence clearly highlights the significant benefits of developing logical thinking skills through problem-solving tasks in primary grades. Regular and structured engagement in these activities not only improves logical reasoning and academic performance but also enhances students' confidence, participation, and overall cognitive development, as reflected by the high percentages reported in various educational studies [5].

Conclusion

In conclusion, the educational process based on problem-solving tasks in primary grades is effective in developing students' logical thinking. Problem assignments support students ' independent thinking and involve them in the process of active cognition. The effective organization of this process serves to improve the quality of Education. Therefore, it is pedagogically advisable to widely use these tasks in primary education practice.

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